

## The political determinants of the cholera outbreak in Yemen

At the end of June, 2017, UNICEF and WHO released a statement declaring that Yemen is “facing the worst cholera outbreak in the world”.<sup>1</sup> The statement points out that the outbreak is caused by the civil war that began in 2015, but it does not suggest that one party is more responsible than another, simply noting that “two years of heavy conflict” have resulted in “collapsing health, water and sanitation systems”. Nor does it point to one side being more affected by the outbreak, stating

that “cholera has spread to almost every governorate”.

When one combines WHO’s latest epidemiological data for the period April 27 to July 31, 2017,<sup>2</sup> with data from Risk Intelligence that maps areas of government and rebel control,<sup>3</sup> it is clear that the cholera outbreak disproportionately affects areas controlled by Houthi rebels (table). 67.1% of Yemenis live in governorates wholly or mostly controlled by Houthis, whereas 22.7% live in government-controlled governorates. (The remainder live in Taizz governorate, significant parts of which are controlled by both sides.) 77.7% of cholera cases (339 061 of 436 625) and 80.7% of deaths from

cholera (1545 of 1915) occurred in Houthi-controlled governorates, compared to 15.4% of cases and 10.4% of deaths in government-controlled governorates. The attack rate was 17.9 per 1000 population in Houthi-controlled areas compared with 10.0 per 1000 population in government-controlled areas, while the case-fatality rate was 0.46% in Houthi-controlled areas compared to 0.30% in government-controlled areas.<sup>2</sup> One tailed t-tests demonstrate that attack rates ( $t=-1.882$ ,  $p=0.038$ ) and case-fatality rates ( $t=-2.435$ ,  $p=0.013$ ) are statistically higher in Houthi-controlled governorates than in those under government control.

Both sides have been accused of disregarding the wellbeing of civilians and breaching international humanitarian law. However, the government is supported by a Saudi-led coalition and this alliance commands far greater resources than the rebels. As a result, Houthi-controlled areas have been disproportionately affected by the conflict, which has created conditions conducive to the spread of cholera.<sup>4</sup> Saudi-led airstrikes have destroyed vital infrastructure, including hospitals and public water systems, hit civilian areas, and displaced people into crowded and insanitary conditions. A Saudi-enforced blockade of imports has caused shortages of, among other things, food, medical supplies, fuel, and chlorine, and restricted humanitarian access. As the Saudi-led coalition has played a key role in the collapse of health, water, and sanitation systems in rebel-controlled areas, it is bizarre that UNICEF recently published a press release welcoming Saudi Arabian “generosity” after the Kingdom donated US\$67 million to the cholera response in Yemen.<sup>5</sup>

We declare no competing interests.

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	Cases	Deaths	Attack rate (per 1000)	Case fatality rate (%)
<b>Governorates controlled predominately by government</b>				
Abyan	14 474	33	23.7	0.23
Aden	13 022	52	13.6	0.40
Al Dhale'e	24 849	76	33.0	0.31
Al Jawf	4203	16	6.5	0.48
Al Mahrah	731	1	4.5	0.14
Lahj	7124	17	6.8	0.24
Ma'areb	2485	4	6.9	0.26
Hadramout	28	0	0.0	0.00
Shabwah	430	1	0.7	0.23
Socotra	0	0	0.0	..
Abyan	14 474	33	23.7	0.23
All	67 346	200	10.0	0.30
<b>Governorates controlled predominately by rebels</b>				
Al Bayda	12 872	26	16.7	0.20
Al Hudaydah	53 803	231	16.1	0.43
Al Mahwit	25 809	128	33.9	0.50
Amanat Al Asimah	53 975	60	16.3	0.11
Amran	44 457	150	29.1	0.34
Dhamar	33 647	132	15.9	0.39
Hajjah	45 346	359	20.4	0.79
Ibb	32 605	242	10.6	0.74
Raymah	7758	95	12.2	1.22
Sa'ada	1176	5	1.3	0.43
Sana'a	27 613	117	22.1	0.42
All	339 061	1545	17.0	0.46
<b>Governorates controlled by government and rebels</b>				
Taizz	30 218	170	10.0	0.56
<b>Total</b>				
All	436 625	1915	14.7	0.44

Table: The Yemeni cholera outbreak by governorate

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- 1 UNICEF, WHO. Statement from UNICEF Executive Director Anthony Lake and WHO Director-General Margaret Chan on the cholera outbreak in Yemen as suspected cases exceed 200,000. <http://www.who.int/mediacentre/news/statements/2017/Cholera-Yemen/en/> (accessed Aug 14, 2017).
- 2 WHO. Yemen cholera outbreak: daily epidemiology update 31st July. [http://www.emro.who.int/images/stories/Yemen\\_daily\\_epi\\_update\\_20170731.pdf?ua=1](http://www.emro.who.int/images/stories/Yemen_daily_epi_update_20170731.pdf?ua=1) (accessed Aug 15, 2017).
- 3 Risk Intelligence (@riskstaff). #Yemen map: Government forces advancing in the western coast of #Taiz & on the outskirts of the city. <https://twitter.com/riskstaff/status/894870965364150272> (accessed Aug 14, 2017).
- 4 McKernan B. Yemen: almost one death per hour as cholera epidemic spreads like wildfire. <http://www.independent.co.uk/news/world/middle-east/yemen-war-deaths-cholera-epidemic-dying-every-hour-a7782341.html> (accessed Aug 14, 2017).
- 5 UNICEF. UNICEF statement on Saudi contribution to Yemen cholera response. [https://www.unicef.org/media/media\\_96542.html](https://www.unicef.org/media/media_96542.html) (accessed Aug 14, 2017).